

# A discussion of the large extinct rodents of Mootwingee National Park, western New South Wales

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## ABSTRACT

Four large rodent species (Greater Stick-nest Rat *Leporillus conditor*, Long-tailed Hopping-mouse *Notomys longicaudatus*, Plains Rat *Pseudomys australis* and Long-haired Rat *Rattus villosissimus*) have been identified among the subfossil remains collected at Mootwingee National Park, western New South Wales. These records are at the periphery of the published distributions for most of the species and represent an addition to the fauna recorded for the Mootwingee area.

## INTRODUCTION

The rodent fauna of western New South Wales has suffered a serious decline over the last 200 years (Dickman 1993; Dickman *et al.* 1993). However, the full extent of the decline cannot be ascertained without comprehensive distributional information on all of the rodents that occurred there. The only practical methods available to determine the pre-European fauna of western New South Wales are the analysis of subfossil material hidden in numerous caves and crevices across the inland, and the writings of early explorers and settlers hidden away in archives. Such work by Dickman (1993) has already shown the diversity of rodents in western New South Wales to be greater than determined by Watts and Aslin (1981). Similar studies in the Flinders Ranges (see Tunbridge 1991) have led to the listing of 58 mammalian species as having occurred in that area.

Regurgitated owl pellets recovered from the ranges in the Mootwingee National Park (31°10'S 142°21'E) provide a record of the small mammal fauna of the district (Ellis *et al.* 1991; Ellis 1992). Three deposits have been found within the park; two on the eastern side in the Gap Hills and one on the western side in the Bynguano Range. Several thousand bone fragments have been recovered from the deposits and it will take some years before all the species are identified and counts of the numbers of individuals are completed. However, these deposits have already revealed the existence of bandicoot and dasyurid species in the vicinity of the park. Many of these species have not been captured during recent trapping exercises in western New South Wales (Dickman and Read 1992; Dickman *et al.* 1993) and are now considered extinct in the state.

The subfossil material collected from Mootwingee also contained a variety of rodent skulls and dentaries. These bones were sorted into groups of similar size and structure. The bones

were then compared to similar sized material held at the Australian Museum and descriptions in Watts and Aslin (1981) to aid in identification. Some fragments of the House Mouse *Mus domesticus* and the Fawn Hopping-mouse *Notomys cervinus* are the only positively identified species among smaller rodents (Ellis 1993). The bulk of the skull material is from *Rattus*, but at least three other large rodents are also present. Most of the bones examined have not been assigned to a species as there is little comparative material available for some of the rarer or extinct species, and the range of variation in the more common species need to be accounted for.

### **Greater Stick-nest Rat *Leporillus conditor***

The remains of stick nests in caves and on ledges across Mootwingee attest to the original presence of a species of *Leporillus* in the area, with Green *et al.* (1983) studying one such nest in detail. It was during investigations of another dozen nests that led to the original discovery of the owl pellet deposits in 1988 (Ellis *et al.* 1991). Sidney Kidman had noted the presence of stick-nest rats near Broken Hill in the late 19th Century (Idriess 1936), although Dickman (1993) suspects that it was actually the Lesser Stick-nest Rat *Leporillus apicalis* that was seen. Sturt (1847) collected a specimen of *Leporillus conditor* from approximately 150 kms south of Mootwingee, and found further nests to the north-west of Mootwingee and assumed they were made by the same species (Fig. 1). Subfossil remains have also been collected in the Flinders Ranges (Tunbridge 1991).

Maxillary fragments from the owl pellets confirm the presence of *Leporillus conditor* within the area. Ranger Sharon Davey of the NSW National Parks and Wildlife Service recently, in 1992, found a complete skull of *L. conditor* from the Gap Hills in the east of Mootwingee National Park, near one of the owl pellet deposits. However, the identification of one species of stick-nest rat does not preclude the possibility that both species were present in the region.

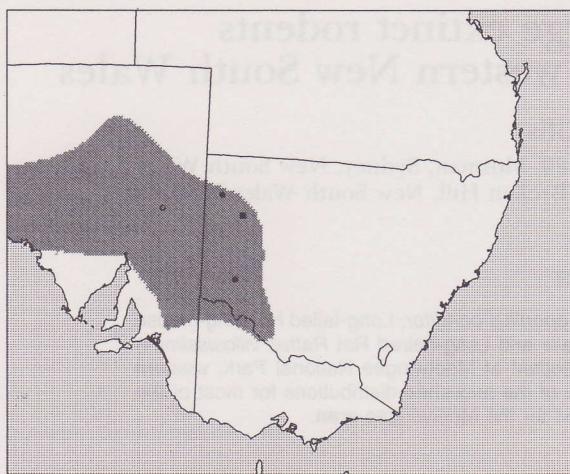


Fig. 1. The distribution of *Leporillus conditor* in southeastern Australia. Solid circles represent Sturt's records, the open circle the Flinders Ranges record, and the solid square the Mootwingee record. Stippling shows the range according to Watts and Aslin (1981).

The combination of historical records and subfossil materials show that this species was once widespread in the Mootwingee-Broken Hill area. The presence of 12 old nests within 300 m of one of the owl pellet deposits also indicates that a substantial population existed within at least part of the park at one time.

#### **Long-tailed Hopping-mouse** *Notomys longicaudatus*

Sturt (1847) collected a live animal in 1845 in the Coonabarabran Range, mistakenly described as being in Queensland by Dixon (1983). This area is adjacent to Stephens Creek Reservoir, immediately east of Broken Hill, New South Wales, and about 100 km south of Mootwingee. Complete skulls of this little-known large hopping-mouse were recovered from intact owl pellets from within the park.

This species was little known in life except that it was a minor pest in Western Australia (Watts and Aslin 1981), but has been found in other deposits in the arid zone (Smith 1977; Copley *et al.* 1989) (Fig. 2). Given the wide range of locations that live animals were collected from, and the increasing number of locations its remains have been found, this species must have once occupied much of the arid and semi-arid zones of western and central Australia.

#### **Plains Rat *Pseudomys australis***

The Plains Rat has had a convoluted taxonomic history. The species, or species complex, once occurred over much of the southeastern half of Australia (Breed and Head 1991) (Fig. 3). However, there is a paucity of records for New South Wales where early settlement and development outstripped any study of the

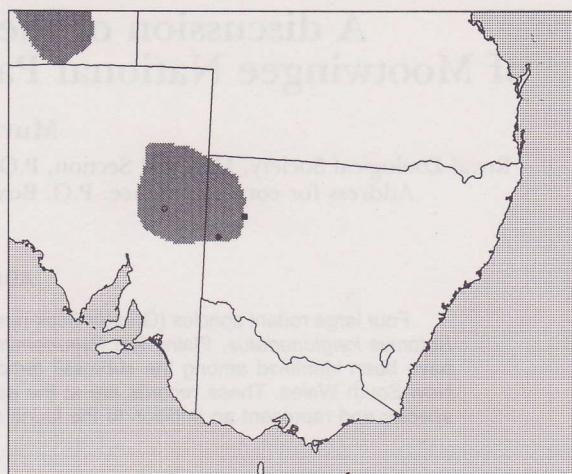


Fig. 2. The distribution of *Notomys longicaudatus* in southeastern Australia. The solid circle represents Sturt's record, the open circle the Flinders Ranges records, and the solid square the Mootwingee records. Stippling shows the range according to Watts and Aslin (1981).

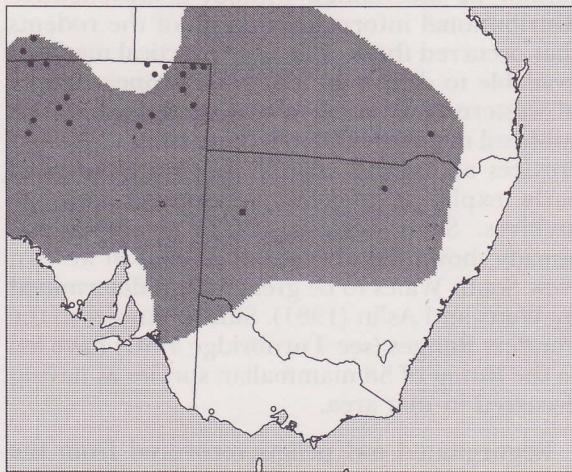


Fig. 3. The distribution of *Pseudomys australis* in southeastern Australia. The open circles represent subfossil records, solid circles live collections (after Breed and Head (1991)), and the solid square the Mootwingee records. Stippling shows the range according to Watts and Aslin (1981).

inland fauna. The species has not been collected alive in New South Wales for over 100 years, but in 1990 was found in northern South Australia, almost 1 000 km from Mootwingee (Breed and Head 1991).

Some skulls and mandibles from the Mootwingee deposits have been assigned to the Plains Rat. This is the only precisely located record for western New South Wales with the other known record being from the plains of the Darling by John Gould (see Dickman 1993).

There is some variation among the *Pseudomys* material and there may also be other similar sized species of *Pseudomys*, such as *P. gouldii* or

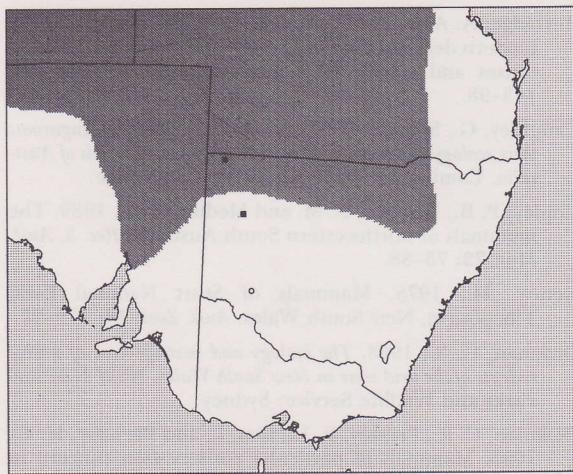


Fig. 4. The distribution of *Rattus villosissimus* in southeastern Australia. The solid circle represents Denny's (1975) records, the open circle the Garnpung record, and the solid square the Mootwingee records. Stippling shows the range according to Watts and Aslin (1981).

*P. glaucus*, within the material. Additional comparative material will need to be examined before all of the bones can be assigned to species.

#### Long-haired Rat *Rattus villosissimus*

The Long-haired Rat is currently known from Sturt National Park in the far north-west of New South Wales (Denny 1975) (Fig. 4). Kidman (Idriess 1936) records a swarm of rats, presumably this species, near Lake Cobham in 1883, 130 km north-west of Mootwingee. Furthermore, Steve Mossfield from the NSW National Parks and Wildlife Service collected mummified remains of this species from the wall cavity of the old Garnpung Homestead 280 km south of Mootwingee. This indicates that the species was extant that far south in New South Wales within the last 110 years (the approximate age of the building).

The bulk of the skulls recovered from the two Mootwingee deposits are from *Rattus* species, with some being assignable to *R. villosissimus*. A skull and partial skeleton of the Long-haired Rat were also recovered from the remains of an old stick-nest located in an overhang at the top of the scree slopes in the Gap Hills. The nest is likely to have been constructed by a stick-nest rat, although some nest building activity has been recorded for other *Rattus* species (Watts and Aslin 1981). The most likely explanation is that during a "plague" period individuals of this highly mobile species invaded the scree slopes from their more usual floodplain habitats (Watts and Aslin 1981).

#### GENERAL DISCUSSION

The actual age of the owl pellets is open to question. Using radiocarbon dating techniques Green *et al.* (1983) gave an age of 1 800 years

for the remains of a stick-nest rat nest from the Gap Hills. The nest they dated was highly decomposed, burnt and consisted of little more than "amberat", a solid bitumenous mass, located in a narrow crevice in a larger overhang. Nests from nearer the Gap Hills owl pellet site still had a large amount of stick and twig associated with them, but only in the narrower crevices and ledges where goats and macropods were unable to destroy them. It seems likely that these more intact nests were much younger than the radiocarbon dated one.

Live animals of some species found in the Mootwingee deposits have been found within 200 km of the park over the last 20 years (Dickman 1993; Denny 1975; M. Denny, pers. comm.; D. Read, pers. comm.; M. Ellis, pers. obs.) indicating that some of the pellets could have been deposited until recently and still contain that fauna. The presence of *Mus* remains in some pellets gives evidence that some of the owl pellets were deposited post the invasion of inland New South Wales by that species. There is the possibility that *Mus* arrived in Australia on early shipwrecks 300 to 400 years ago. However, no *Mus* were collected by Sturt (1847) or by Kreft during the Blandowski expedition (Kreft 1866; Wakefield 1966). This indicates that *Mus* probably arrived in western New South Wales with European explorers and settlers in the latter half of the 1800s, meaning that some of the pellet material is less than 150 years old. Thus it seems reasonable to assume that these four rodent species were part of the local fauna of the Mootwingee area at the time of European settlement of Australia. Only radiocarbon dating will resolve this point to any greater degree.

Three of the four are now extinct in New South Wales, with one species being extinct Australia-wide (Dickman 1993). These four species were all predominantly vegetarian, with diets ranging from foliage to seeds (Watts and Aslin 1981). With the advent of grazing in the area in the 1860s, these species came into competition for food with sheep and goats. Human assistance for the introduced species allowed them to dominate the area. The sheep population in the Western Division of New South Wales reached a figure almost double the current recommended carrying capacity (Caughley *et al.* 1987), to the detriment of the native herbivores. These native rodents fall within the critical weight range of Burbidge and McKenzie (1989) indicating that they are susceptible to predation by introduced predators. With the reduction in plant cover due to heavy grazing pressure, foraging would have required increased exposure by the animals and these species must have become easy prey for introduced foxes and cats as well as native predators. This combination of changes has been too great for these large rodents to survive in the area.

The study of subfossil material from the Flinders Ranges is the closest comparable study (Smith 1977; Tunbridge 1991). The Northern Flinders Ranges and Mootwingee share a similar latitude, geology and climate (Tunbridge 1991) and so the results from the Flinders Ranges provide a good starting point for examining the Mootwingee fauna. The continuing study of the material from Mootwingee narrows the difference in the number of species recorded from the ranges of the Mootwingee area versus the better-studied Flinders Ranges (Smith 1977; Tunbridge 1991). Some of the species from the more mesic southern end of the Flinders Ranges, such as Common Ringtail Possum *Pseudocheirus peregrinus*, probably did not occur in the drier Mootwingee area. However, most of the 58 species of mammals listed by Tunbridge (1991) were found in the Northern Flinders Ranges and could have occurred in Mootwingee. Only detailed examination of the sub-fossil record will reveal the true composition of the fauna of the area. Even so, the area is now known to have had a richer rodent fauna than was predicted by Watts and Aslin (1981).

Such examinations as this are highlighting the extent of the loss of fauna from inland Australia. The known loss of species is gradually proving to be an underestimate, and the future for many of the remaining arid zone mammalian species is bleak (Dickman *et al.* 1993). If any of these locally extinct species are to be returned to Mootwingee then the problems of the broad habitat requirements, diet and predation risk need to be reviewed and resolved. For some it is too late and they can be returned to Mootwingee only as a lifeless display in a visitor centre.

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